

Listing of Claims

Claims 9-13 and 21-25 were canceled without prejudice or disclaimer in Applicants' Response to Restriction Requirement and Amendment dated November 29, 2004.

This listing of claims replaces all prior versions, and listings, of claims in the application:

Claim 1: (original) A software receiver comprising:

- a receiver capable of receiving a radio signal;
- means for digitizing the radio signal; and
- a software correlator capable of mixing the digitized radio signal to form a baseband signal using bit-wise parallelism.

Claim 2: (original) The software receiver of claim 1 wherein said software correlator comprises:

- means for computing correlations between the baseband signal and at least one pseudo-random number (PRN) code using the bit-wise parallelism.

Claim 3: (original) The software receiver of claim 2 wherein said software correlator further comprises:

- means for computing accumulations from the correlations using the bit-wise parallelism.

Claim 4: (original) The software receiver of claim 3 further comprising:

- application-specific code capable of computing navigation data using the accumulations.

Claim 5: (original) The software receiver of claim 1 wherein said means for digitizing comprises:

- means for down-converting the radio signal to an intermediate frequency; and
- a digitizer capable of digitizing the intermediate frequency.

Claim 6: (original) The software receiver of claim 5 wherein said digitizer produces at least one bit/sample.

Claim 7: (original) The software receiver of claim 5 wherein said digitizer is an analog to digital converter.

Claim 8: (previously presented) A method for processing at least one radio frequency (RF) signal over an accumulation period comprising the steps of:

- receiving at least one RF signal;
- mixing the at least one RF signal to form a baseband mixed signal using bit-wise parallelism;
- computing a fully mixed prompt integrand as a function of the baseband mixed signal and a pre-selected pseudo-random number (PRN) code using the bit-wise parallelism;
- computing a fully mixed early-minus-late integrand as a function of the baseband mixed signal and the pre-selected PRN code using the bit-wise parallelism;
- computing in-phase summed accumulations and quadrature summed accumulations over the accumulation period, the in-phase summed accumulations and quadrature summed accumulations being functions of the fully mixed prompt integrand and the fully mixed early-minus-late integrand; and
- rotating the in-phase summed accumulations and quadrature summed accumulations to correct for effects of frequency and phase granularity of the baseband mixed signal.

Claim 9: (cancelled)

Claim 10: (cancelled)

Claim 11: (cancelled)

Claim 12: (cancelled)

Claim 13: (cancelled)

Claim 14: (original) A software receiver comprising:

a front-end device capable of receiving a radio signal, said front-end device capable of converting the radio signal into signal data;

a data acquisition device capable of receiving the signal data, said data acquisition device capable of providing the signal data to a microprocessor;

at least one shift register capable of packing the signal data into at least one data word;

a baseband mixer capable of computing at least one baseband mixed signal as a function of the at least one data word by using bit-wise parallel processing;

a correlator capable of computing correlations between the baseband mixed signal and a pseudo-random number (PRN) code replica signal; and

an accumulator capable of computing summed accumulations by accumulating the correlations.

Claim 15: (original) The software receiver of claim 14 wherein the signal data further comprises a signal sign.

Claim 16: (original) The software receiver of claim 14 wherein the signal data further comprises a signal sign and at least one signal magnitude.

Claim 17: (original) The software receiver of claim 14 wherein said correlator uses the bit-wise parallel processing for computing the correlations.

Claim 18: (original) The software receiver of claim 14 wherein said accumulator accumulates the correlations by an electronic mechanism.

Claim 19: (original) The software receiver of claim 14 wherein the radio signal can be received from a global positioning source.

Claim 20: (original) The software receiver of claim 14 wherein said correlator can be adapted to perform functions selected from a group consisting of accepting the radio signal at any

frequency, accepting any PRN code, and accepting the radio signal from any device that generates a radio signal.

Claim 21: (cancelled)

Claim 22: (cancelled)

Claim 23: (cancelled)

Claim 24: (cancelled)

Claim 25: (cancelled)

Claim 26: (original) A node in a computer network capable of carrying out the method according to claim 8.

Claim 27: (original) A communications network comprising at least one node for carrying out the method according to claim 8.

Claim 28: (original) A computer data signal embodied in electromagnetic signals traveling over a computer network carrying information capable of causing a computer system in the network to practice the method of claim 8.

Claim 29: (original) A computer readable medium having instructions embodied therein for the practice of the method of claim 8.

Claim 30: (previously presented) The method of claim 8 wherein said step of computing in-phase and quadrature summed accumulations comprises the steps of:

representing a carrier replica signal from at least one channel from a plurality of channels as a carrier replica sign and a carrier replica magnitude;

representing the at least one RF signal from the at least one channel of the plurality of channels as at least one signal word;

computing a baseband mixed sign as a function of the carrier replica sign and the at least one signal word;

computing a baseband mixed magnitude as a function of the carrier replica magnitude;

selecting a pseudo-random number (PRN) code having a prompt PRN code and an early-minus-late PRN code;

representing the prompt PRN code as a prompt PRN code sign;

computing a fully mixed prompt integrand sign as a function of the baseband mixed sign and the prompt PRN code sign;

representing the early-minus-late PRN code as an early-minus-late PRN code sign and an early-minus-late PRN code zero mask;

computing a fully mixed early-minus-late integrand sign as a function of the baseband mixed sign and the early-minus-late PRN code sign;

computing at least one set of prompt integrand value words as a function of the fully mixed prompt integrand sign and the baseband mixed magnitude;

computing at least one set of early-minus-late integrand value words as a function of the fully mixed early-minus-late integrand sign, the baseband mixed magnitude, and early-minus-late PRN code zero mask;

computing prompt in-phase and quadrature summed accumulations for the plurality of channels for an accumulation interval as functions of the number of significant bits in the at least one set of prompt integrand value words and as functions of the values associated with the at least one set of prompt integrand value words; and

computing early-minus-late in-phase and quadrature summed accumulations for the plurality of channels as functions of the number of significant bits in the at least one set of early-minus-late integrand value words and as functions of the values associated with the at least one set of early-minus-late integrand value words.

Claim 31: (previously presented) The method of claim 30 further comprising the step of:

selecting the significant bits from a group consisting of zeros and ones.

Claim 32: (previously presented) The method of claim 30 further comprising the step of:
retrieving the carrier replica signal from a carrier replica table, the carrier replica table representing a coarse grid of frequencies.

Claim 33: (previously presented) The method of claim 30 further comprising the step of:
representing the signal word from the at least one channel as a signal sign and a signal magnitude; and
computing at least one baseband mixed magnitude as a function of the carrier replica magnitude and the signal magnitude.

Claim 34: (previously presented) The method of claim 33 further comprising the step of:
retrieving the carrier replica signal from a carrier replica table, the carrier replica table representing a coarse grid of frequencies.

Claim 35: (previously presented) The method of claim 8 wherein said step of computing a fully mixed prompt integrand comprises the step of:
generating the pre-selected pseudo-random number (PRN) code using the bit-wise parallelism, said step of generating the pre-selected PRN code comprising the steps of:
formulating a tabulated function for use in translating code chip and timing values into PRN code using the bit-wise parallelism;
generating at least one prompt PRN code in real-time;
choosing at least one chip value from the at least one prompt PRN code, the at least one chip value corresponding to at least one data interval that contains at least one sample of a data word, the at least one chip value having a known timing relative to the at least one data interval;
transforming the known timing into a time grid index; and
translating the at least one chip value and the time grid index during the at least one data interval into the PRN code using the bit-wise parallelism for the at least one data interval, said step of translating resulting from the use of the tabulated function.

Claim 36: (previously presented) The method of claim 35 further comprising the step of:
 computing the time grid index as a function of a time offset index k , and an auxiliary
table index m_n .

Claim 37: (previously presented) The method of claim 35 further comprising the step of:
 computing the time grid index iteratively as a function of a previously-computed time
grid index, the at least one prompt PRN code, and the timing values associated with the at least
one prompt PRN code.